

**WHAT IS CLAIMED IS:**

- 1        1.        A method of linking control transfer information with sampling  
2 information for instructions executing in a processor comprising:  
3            storing information relating to execution events;  
4            selecting an instruction for sampling;  
5            storing information relating to the instruction for sampling;  
6            freezing the information relating to execution events when the information  
7                relating to the instruction for sampling is to be reported to provide  
8                frozen execution event information;  
9            reporting the information relating to the instruction for sampling; and,  
10          enabling access to the frozen execution event information.
- 1        2.        The method of claim 1 further comprising:  
2            freezing the execution event information provides information to enable  
3                reconstructing an execution path of events adjoining the instruction.
- 1        3.        The method of claim 1 wherein:  
2            the storing information relating to execution events and the storing  
3                information relating to the instruction occur within separate structures  
4                of a processor.
- 1        4.        The method of claim 1 wherein:  
2            the freezing the information relating to execution events disables storing of  
3                additional information relating to execution events.
- 1        5.        The method of claim 1 further comprising:  
2            enabling storing information relating to execution events occurring after  
3                execution of the instruction for sampling.
- 1        6.        An apparatus for linking control transfer information with sampling  
2 information for instructions executing in a processor comprising:  
3            means for storing information relating to execution events;

4 means for selecting an instruction for sampling;  
5 means for storing information relating to the instruction;  
6 means for freezing the information relating to execution events when the  
7 information relating to the instruction for sampling is to be reported to  
8 provide frozen execution event information;  
9 means for reporting the information relating to the instruction; and,  
10 means for enabling access to the frozen execution event information.

1 7. The apparatus of claim 6 wherein:

2 means for freezing the execution event information provides information to  
3 enable reconstructing an execution path of events adjoining the  
4 instruction.

1 8. The apparatus of claim 6 wherein:

2 the means for storing information relating to execution events and the means  
3 for storing information relating to the instruction are located within  
4 separate modules of a processor.

1 9. The apparatus of claim 6 wherein:

2 the freezing the information relating to execution events disables storing of  
3 additional information relating to execution events.

1 10. The apparatus of claim 6 further comprising:

2 means for enabling storing information relating to execution events occurring  
3 after execution of the instruction for sampling.

1 11. A processor comprising:

2 an instruction pipeline;  
3 a sampling mechanism coupled to the instruction pipeline, the sampling  
4 mechanism selecting an instruction for sampling and storing  
5 information relating to the instruction for sampling;  
6 a history queue coupled to the pipeline, the history queue storing information  
7 relating to execution events, the history queue freezing the information

8 relating to execution events when the information relating to the  
9 instruction for sampling is to be reported to provide frozen execution  
10 event information so as to enable linking control transfer information  
11 with sampling information for instructions executing in the processor.

1 12. The processor of claim 11 wherein:  
2 the sampling mechanism reports the information relating to the instruction for  
3 sampling.

1 13. The processor of claim 11 wherein:  
2 the history queue enables access to the frozen execution event information.

1 14. The processor of claim 11 wherein:  
2 freezing the execution event information provides information to enable  
3 reconstructing an execution path of events adjoining the instruction.

4 15. The processor of claim 11 wherein:  
5 freezing the information relating to execution events disables storing of  
6 additional information relating to execution events.

1 16. The processor of claim 11 wherein:  
2 the history queue stores information relating to execution events occurring  
3 after execution of the instruction for sampling.

1 17. A method of monitoring control transfer information for instructions  
2 executing in a processor comprising:  
3 storing information relating to execution events;  
4 freezing the information relating to execution events when the information  
5 relating to the instruction is to be reported to provide frozen execution  
6 event information; and,  
7 enabling access to the frozen execution event information.

- 1        18.    The method of claim 17 wherein:
- 2        the freezing occurs based upon an instruction sample being reported.